

## CLAIMS

1. A surface inspection method comprising the steps of:  
  
inspecting a surface of an object under inspection optically,  
  
detecting defects on the surface of the object under inspection and their  
features according to inspection results,  
  
detecting positions of the detected defects on the surface of the object  
under inspection,  
  
classifying the detected defects according to their features, and  
  
performing X-ray analyses on the defects based on the positions of the  
defects and the features or classification results of the defects.
2. The surface inspection method according to claim 1 further comprises  
the step of:  
  
performing re-classifications of the defects according to X-ray analysis  
results of the defects.

3. The surface inspection method according to claim 1, wherein the X-ray analyses are performed on the defects, which are selected according to predetermined conditions about the features or the classification results of the defects.

4. The surface inspection method according to claim 3 further comprises the step of:

performing re-classifications of the defects according to X-ray analysis results of the defects.

5. The surface inspection method according to claim 1 further comprises the steps of:

displaying the positions and the classification results of the defects, and  
picking the defects, on which the X-ray analysis should be performed, among the displayed defects.

6. The surface inspection method according to claim 5 further comprises the step of:

performing re-classifications of the defects according to X-ray analysis results of the defects.

7. The surface inspection method according to claim 1 further comprises the steps of:

displaying the positions and the classification results of the defects,

picking the defects, on which a shape analysis should be performed, among the displayed defects,

reexamining the picked defects optically,

performing the shape analyses on the defects according to reexamination results, and

picking the defects, on which the X-ray analysis should be performed, based on shape analysis results.

8. The surface inspection method according to claim 7 further comprises the step of:

performing re-classifications of the defects according to X-ray analysis results of the defects.

9. The surface inspection method according to claim 1 further comprises the steps of:

displaying the positions and the classification results of the defects,  
picking the defects, on which an observation using an optical microscope should be performed, among the displayed defects,  
observing the picked defects using the optical microscope, and  
picking the defects, on which the X-ray analysis should be performed, based on observation results.

10. The surface inspection method according to claim 9 further comprises the step of:

performing re-classifications of the defects according to X-ray analysis

results of the defects.

11. A surface inspection apparatus comprising:

an optical inspection means for inspecting a surface of an object under inspection optically,

a processing means for detecting defects on the surface of the object under inspection and their features according to inspection results from said optical inspection means, for detecting positions of the detected defects on the surface of the object under inspection, for classifying the detected defects according to their features, and for selecting or picking the defects, on which a X-ray analysis should be performed, and

a X-ray inspection means for performing the X-ray analyses on the defects selected or picked by said processing means.

12. The surface inspection apparatus according to claim 11, wherein said processing means performs re-classifications of the defects according to X-ray analysis results of the defects from said X-ray inspection means.

13. The surface inspection apparatus according to claim 11, wherein said processing means selects the defects, on which the X-ray analysis should be performed, according to predetermined conditions about the features or the classification results of the defects.

14. The surface inspection apparatus according to claim 13, wherein said processing means performs re-classifications of the defects according to X-ray analysis results of the defects from said X-ray inspection means.

15. The surface inspection apparatus according to claim 11, wherein said processing means has a display device, which displays the positions and the classification results of the defects, and an input device for picking the defects, on which the X-ray analysis should be performed, among the defects displayed by said display device.

16. The surface inspection apparatus according to claim 15, wherein said processing means performs re-classifications of the defects according to X-ray

analysis results of the defects from said X-ray inspection means.

17. The surface inspection apparatus according to claim 11, wherein said processing means has a display device, which displays the positions and the classification results of the defects, and an input device for picking the defects, on which a shape analysis should be performed, among the defects displayed by said display device,

said optical inspection means reexamines the defects, which are picked by said input device, optically, and

said processing means performs the shape analyses on the defects according to reexamination results from said optical inspection means and displays shape analysis results on said display device.

18. The surface inspection apparatus according to claim 17, wherein said processing means performs re-classifications of the defects according to X-ray analysis results of the defects from said X-ray inspection means.

19. The surface inspection apparatus according to claim 11 further comprises an optical microscope, wherein said processing means has a display device, which displays the positions and the classification results of the defects, and an input device for picking the defects, on which an observation using said optical microscope should be performed, among the defects displayed by said display device.

20. The surface inspection apparatus according to claim 19, wherein said processing means performs re-classifications of the defects according to X-ray analysis results of the defects from said X-ray inspection means.